

EA ~~non-peroxide~~
metal salt preparation [as] for a first application to the wood substrate, and

(b) [an] a second component aqueous solution of oxygen source preparation [as] for a sequential application to the wood substrate,

the aqueous solution preparations being adapted to sequentially penetrate the wood substrate when sequentially applied, and both aqueous solution preparations when applied sequentially in effective amounts, being adapted to react with each other within the wood substrate to impart physical color characteristic to the wood substrate.

REMARKS

The applicant appreciates the interview courteously granted by Examiner Liott on February 18, 1999. Entry of the above amendment, consideration and allowance of the claims are requested.

Claim 2 linking claim. Entry of the amendments and allowance are respectfully requested.

The invention is new and unobvious. The concept of the invention is easy to appreciate. The invention provides permanent wood staining without use of hazardous or environmentally unfriendly chemicals.

The invention has two parts, and the staining is accomplished in two steps. The first part is an aqueous solution of metal salts, which is applied to the wood and which penetrates

the surface of the wood. The second solution is an aqueous oxidizer solution which penetrates the wood and fixes the metal salts in place within the wood. During the interview the applicant demonstrated to the examiner the staining of wood by first brushing on the first aqueous solution of the metal salt and allowing that solution to penetrate the wood and dry, and then brushing on the second aqueous solution of the oxidizing material for fixing the metal salts in the wood and then allowing that solution to dry. After the demonstration, in preparation for the discarding of the tiny amounts of the unused portions of the solutions, the applicant poured one into the other and immediately the clear mixed solution was filled with particles, which appeared to be the metal salts going out of the solution.

The applicant has described his invention as a kit for treating wood, the treating of the wood with the kit, and the article produced by treating the wood with the kit.

Against the kit claims the examiner has applied six references separately. The first reference, Dombay, has nothing to do with the present invention. Dombay merely coats wood with an oxidizing agent to lighten the wood. Dombay uses ammonium persulfate, and cupric sulfate as accelerants in concentrated hydrochloric acid with a methylated spirit, and an organic solvent teepol. In some cases Dombay treats some woods with an A solution to produce a darkening effect, and some woods with a B solution to produce a lightening effect. Whatever the result of Dombay, it is clear that Dombay does not teach the present

invention as specifically pointed out in the claims.

The second reference cited by the examiner is Zemans. Zemans is strictly a bleach that first uses a sodium carbonate bleach, and then a hydrogen peroxide bleach, and finally neutralizes the bleach with a weak acid solution. That weak acid solution may be the same weak acid with which Dombay stops his bleaching, but neither Dombay nor Zemans have anything to do with the present invention.

The third reference cited by the examiner is Gentile. Gentile has nothing to do with the present invention. Gentile is a Scott Paper Company process for pretreating wood chips prior to pulping and fiber liberation, with stabilizers and an alkaline peroxide to brighten the resultant papers. To the extent that Gentile may be related in any way to the present invention, it is the exact opposite of the invention because, Gentile points out near the bottom of column 6 that he does not want to darken the chips or cause any part of the solution to be precipitated to lose its stabilizing or chelating ability.

There is nothing that Gentile could do to anticipate or render obvious any of the claims of the present invention. The examiner's statement that it would be obvious from Gentile to formulate two compositions as kits has no basis in Gentile and would do violence to the teaching of Gentile. Putting two or three chemicals into a pulp would have nothing to do with the present invention. Moreover, the whole purpose of Gentile is to brighten and bleach fibers to brighten the resulting paper.

Brown cited by the examiner has nothing to do with the present invention. Brown does not dye wood, but rather dyes hair, which has nothing to do with dying wood. Moreover, Brown has an intermediate step of contacting hair with an organic solution and rinsing or shampooing the hair, and then bleaching the hair with hydrogen peroxide to obtain a lighter color. The hydrogen peroxide in Brown leads away from the present invention, because the hydrogen peroxide does not fix the metal salts in place. Nor is there anything in Brown which would suggest that Brown be used with wood.

The Hall reference has nothing to do with the present invention because Hall is used for bleaching hair or wool. Hall would lead away from the present invention because Hall teaches bleaching. Moreover, there is nothing in the bleaching of hair which would lead one to dye wood by a two-step aqueous solution kit and treatment, as described and claimed in the present invention. Moreover, Hall uses an intermediate organic solution, which leads away from the present invention.

Light has nothing to do with the present invention because Light is a process for de-canning goatskin, followed by a pickling and re-canning or final canning, followed by neutralization and a combined dying and tallowing. Nothing in Light would refer to wood, and the use of the multiple steps in Light would lead away from the present invention. The complexity of Light would lead one away from the present invention. Moreover, there is nothing in the multiple step process of

treating leather that would suggest a dying of wood in a two-step process.

The Claims are patentable over each of the Dombay, Zemans, Gentile, Brown, Hall and SU 297 references.

Dombay relates to wood bleaching in which the reference mandates the use of methylated spirit, which the present invention particularly avoids. The present specification describes the ill-effects of prior art procedures that mandate alcohol based substances which harm the environment. In fact, Example 4, relied on by the Examiner, provides for 150 ml of methylated spirit. Potassium permanganate and cupric sulphate are used as bleaching accelerants in the one-step Dombay bleaching process. Acetic acid is used to stop the bleaching.

Nothing in the entire reference teaches or suggests the unique kit that has an aqueous solution of a mineral salt and an aqueous solution of a peroxide, with the mineral salt solution being applied prior to the peroxide solution and the in situ reaction of the applied substances with the substrate.

Zemans relates to a bleaching process in which the wood is treated with sodium carbonate, dried, then treated with hydrogen peroxide and again dried, before being treated with a weak acid. That teaching clearly leads away from the invention which does not require acids, the detrimental effects of acid use having been pointed out in the present specification. Zemans sodium carbonate is not the mineral salt being defined in the present invention and Zemans invention relates to the release of oxygen

for effecting bleaching operation, which has nothing to do with the unique coloring provided by the present invention.

Gentile relates to production of wood pulp which has nothing to do with the substrates of the present invention. The Gentile pulp does not require any desirable color effects nor retention of color as would be provided by the present invention. Gentile seeks to brighten a resultant paper by providing a stabilizing flock or sol within the chips before refining them. It is not understood as to how that has anything to do with the claimed in situ reaction of the mineral salts and peroxides and the unique coloring process provided by the present invention.

Brown, from an unrelated art, provides for dyeing hair to promote melanogenesis in hair, which has nothing to do with solid wood substrate coloring. Brown defines dyeing the hair with intermittent intervals to a dark color and then treating with hydrogen peroxide to obtain the desired color. That is contrary to the claimed in situ reaction of the mineral salts and hydrogen peroxide within the wood substrate being treated.

Hall relates to bleaching of hair/wool with a ferrous salt and chelating agent. However, that has nothing to do with the claimed unique kit that has an aqueous solution of a mineral salt and an aqueous solution of a peroxide, with the mineral salt solution being applied prior to the peroxide solution and the in situ reaction of the applied substances with the substrate.

SU '297 relates to leather glove production by tanning in a combined hydrogen peroxide-sodium hydroxide solution and then

tr ating with aluminum slats and dyeing. The reference teaching seeks to solve the problem of repeated tanning and pickling of leather rather than having anything to do with color preservation as uniquely provided by the present invention.

In fact, none of the references teach or suggest the claimed two step in situ treatment with the unique kit defined in the present claims. The present invention uniquely provides treatment of all substrates including light colored wood and is exclusively a two part process.

The invention provides an aqueous solution of a mineral salt thereby providing water soluble ions of mineral salts which are applied to a suitable substrate and allowed to briefly dry. In a second step the water soluble mineral salts transition into insoluble mineral oxide compounds which form inside and around the cellulose fibers. The agents used to transition the mineral salt ions into insoluble oxide compounds include dilute hydrogen peroxide solutions, to prevent harm to the environment, and other dilute strength agents such as sodium peroxide and sodium hydroxide. Again, stronger solutions pose a greater threat to the environment and user.

The present process is expressly useful in enhancing the natural nuances of a particular piece of wood, thereby giving it a more natural color than a conventional stain. The process enhances the variations of color within a given species of wood, therefore differing from the prior art, all of which aim to provide bleaching for more uniform color of wood or of hair,

which is not relevant.

The commercial viability of the present process relies on enhancing the naturally occurring qualities of a specific wood particularly lighter colored species such a Pine, Larch, Poplar, Alder, Maple, Fur, Ash, Bamboo (a grass), Hackberry, Black Willow, Oak, Birch, and others. All of those are considered colored woods, many of which are rapidly grown, sustainable harvestable species.

The prior art expressly intends to impart a stabilized color to dark and medium colored woods by utilizing hypochlorite, persulphate and peroxide compounds. The use of mineral salt ions specifically Iron, Zinc or Silver is not employed or mentioned. In fact, the reference relies on the exclusive use of hypochlorite, persulphate and peroxide compounds to bleach wood.

Contrastingly, the claimed process is expressly concerned with darkening the color of the top-most layer of wood cellulose and other substrates by transitioning water soluble mineral ions into oxides within the top-most layer of the substrate. The process bonds the transitioned minerals to the cellulose fibers and creates a more or less stable color which may slightly lighten or darken over time.

The light fastness is considerably better than prior art dyes (specifically aniline dyes) used to color wood and other substrates. The primary commercial use for the invention is to impart a range of colors (earth tones primarily) to light and medium colored woods and to use as an alternative to conventional

staining products which may contain hazardous VOC's or other hazardous chemical compounds. Also, conventional dyes and colorants for wood does not enhance the natural qualities of the wood or other substrate as does the Auger Mineral Stain Process.

Minerals used in the present invention are expressly create color within the wood or substrate. Minerals utilized alone or in combination are: Iron, Zinc and Silver salts, specifically Iron I Chloride, Sulfate and Perchlorate; Zinc Perchlorate, Silver Perchlorate and Silver Nitrate, among others.

No potassium persulphate, sodium persulfate, ammonium persulfate, sodium carbonate, acetic acid, glacial acetic acid, potassium permanganate, cupric ions or ammonia are used in the claimed process. Thus, the claimed invention always imparts the substrate with an alkaline pH.

Contrary to the above mentioned patent which suggests a minimum 5 minute saturation of the solution on the substrate, the preferred application of the present process is a brief application utilizing a brush, sprayer (power or manual), roller or other method of application which effectively coats the top-most layer of the substrate with the mineral salt solution.

Proper surface preparation consistent with any preparatory procedure used to prepare wood for finishing allows for adequate penetration of the mineral salt solution. Additionally an anionic surfactant may be added to the mineral salt solution to aid in the penetration of the mineral salt solution, this is especially useful for industrial and manufacturing situations

where dust, grease and other debris may be present and form surface tension prohibiting the mineral salt solution (A) from penetrating the substrate.

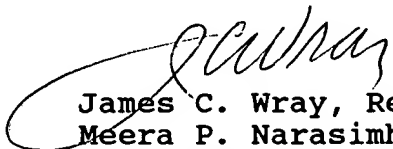
Also, contrary to the prior art, and according to the invention the solution is completely dry prior to the application of the (catalyst) solution.

Contrary to the prior art, the present invention transitions the European Oak instantly through its process to the yellow color the prior art is attempting to avoid. By producing the yellow or "aged" color Auger allows woodworkers to match the tone of "aged" or "antique" wood whereby giving woodworkers the opportunity to make reproductions, restore or color wooden articles in a manner consistent with the color expected from wood which has acquired an "aged" or "antique" appearance.

Nothing in the references, either singly or in combination, teaches or suggests the claimed features. Therefore, the references cannot anticipate nor render obvious any of the claims.

Consideration and allowance are respectfully requested.

Respectfully,



James C. Wray, Reg. No. 22,693
Meera P. Narasimhan, Reg. No. 40,252
1493 Chain Bridge Road, Suite 300
McLean, Virginia 22101
Tel: (703) 442-4800
Fax: (703) 448-7339

April 29, 1999

RECEIVED

MAY 04 1999

GROUP 1700